2016 WINTER WORKSHOP

The Year in Review

Lessons Learned

Clayton Bedwell

Remember This?

Mistakes are meant for learning, not repeating!

The Year in Review

Top 5 Repeated Issues

1. **Longitudinal Joints**
2. **Safety Edges**
3. **Signs**
4. **Adjustment Patches**
5. **Curb Radii**

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No. 1: Longitudinal Joint Issues

- **Layout**
- **Compaction**
- **Running True**

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Joint Layout

Subsection 401.08 Placing Bituminous Mixtures. (1/3/2008) (10/10/2011) (10/22/2013)

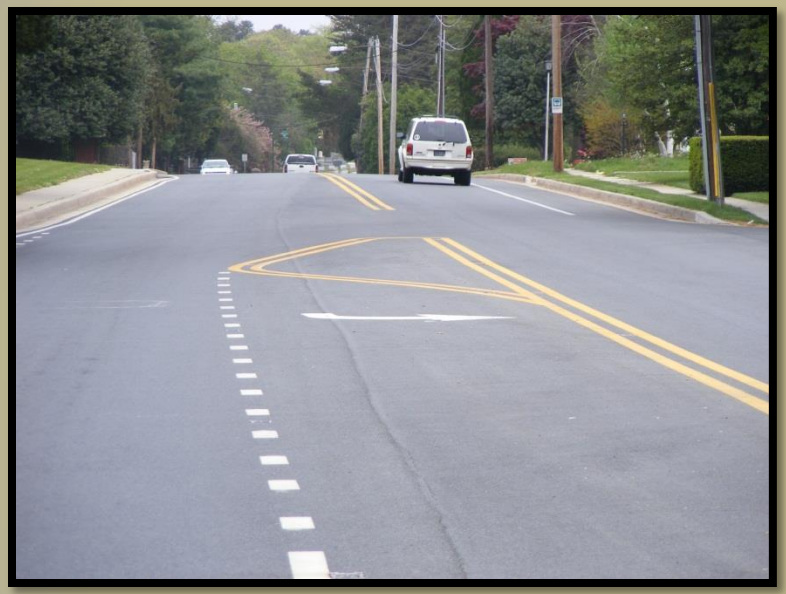
Add the following to the 4th paragraph:

Carefully plan the placement of the surface course to ensure that the joints in the surface course will correspond with the proposed traffic lanes and will not be located in the wheel path of vehicles using the roadway. Locate longitudinal joints at the lane line (center and edge). Longitudinal joints must also be parallel to the centerline unless otherwise shown on the Plans. Place the longitudinal joint between the travel way and shoulder on the shoulder side of the lane line. Establish and follow reference lines or other approved markings to control the true alignment of the longitudinal joints.

Joint Layout

Could this have been performed with one joint instead of two?

Joint Layout



Gore areas are too often laid out incorrectly.

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Joint Layout

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Joint Layout

Consider a Pre-Pave Meeting

Developing a good paving plan ensures that all parties understand what is expected and essential for the project to be successful.

Consider a Pre-Pave Meeting

A pre–paving meeting can be as formal or informal as you desire, however, remember that the purpose of the meeting is for all the parties involved in the project to be aware of each party's responsibilities. This will help the project to proceed smoothly and resolve any potential conflicts and misunderstandings before they happen.

Pre-Pave Meeting Topics

- Weather and Seasonal Limitations
  - Review the Specifications
  - Material Release Requirements/Expectations
- Safety Requirements
  - Apparel
  - Temporary Traffic Control Plan
  - Condition of Traffic Control Devices
  - Lighting requirements
  - Set up and Breakdown Requirements
  - Vertical Differences
  - Temporary Pavement Markings

Pre-Pave Meeting Topics (cont'd.)

- Production Rates
  - Tons/Hour
  - Monitoring Lane Restriction Lengths
- Equipment
  - Paver(s)
    - Profile Control
    - Slope Control (Establish Slope %)
  - Roller(s)
    - Adequate Size
    - Proper Speed (No Waves)
    - Operating Spray Bars

Pre-Pave Meeting Topics (cont'd.)

- Hauling Equipment
  - Clean Bodies
  - Release Agents
- Mechanical Failures
  - Plant Notification
  - Time Allowance (Rejecting Material)
  - Emergency Joint Requirements

Pre-Pave Meeting Topics (cont'd.)

- Condition of Existing Pavement
  - Necessary Repairs
  - Clean / Dry Surface
  - Edges Clipped Back
  - Proper Tack Application
- Construction Methods
  - Delivery Rate to Prevent Paver Stoppage
  - Pull Limits
  - Match-up Requirements

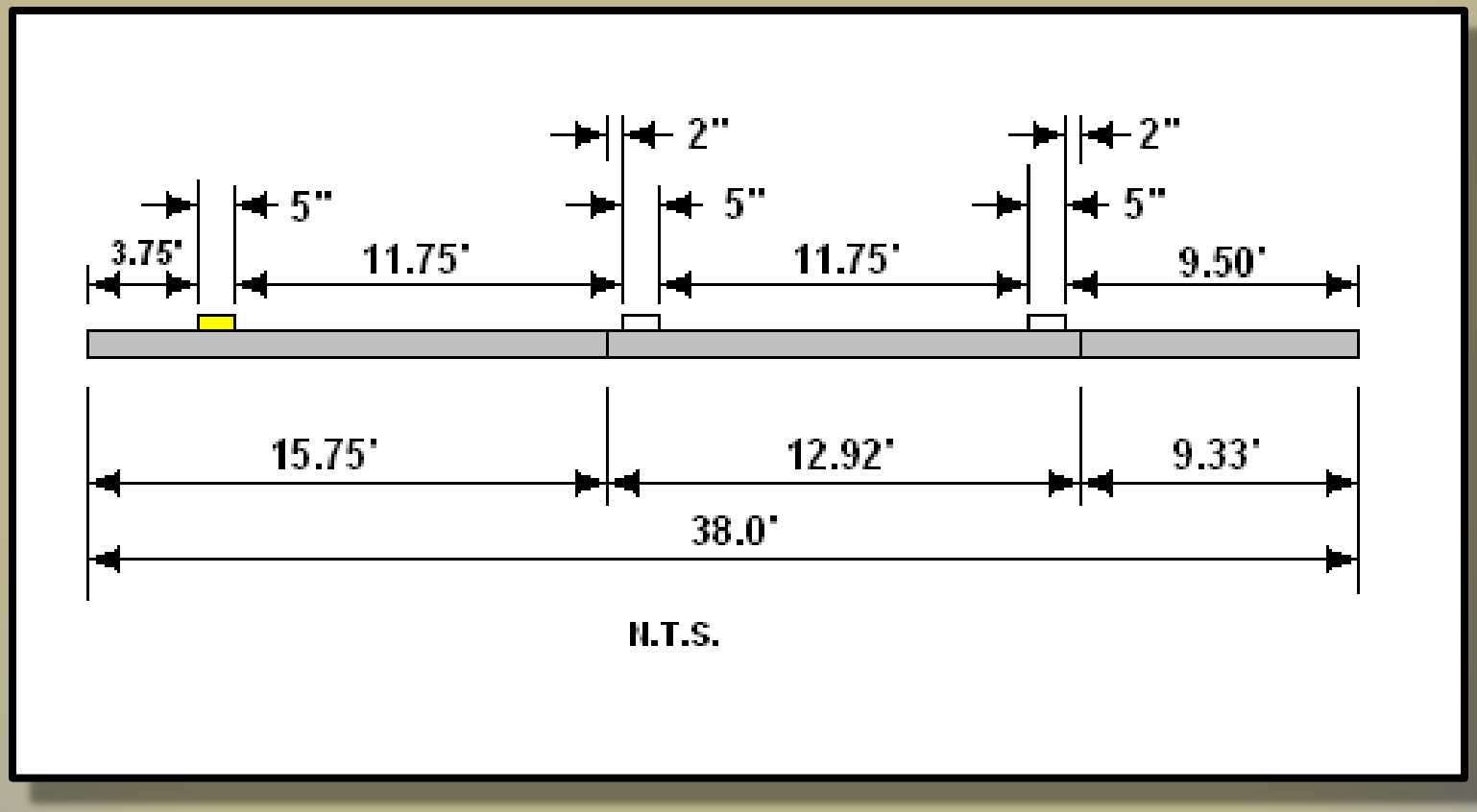
Pre-Pave Meeting Topics (cont'd.)

- Compaction
  - Review Specifications & Provision (401699)
    - Quality Control Requirements
    - Table 5a Notification Procedures
    - Quality Assurance Requirements
    - Dispute Resolution
  - Drive Wheel Toward the Paver
  - Ability to keep up with paver

Pre-Pave Meeting Topics (cont'd.)

- Joints
  - Review Specification Requirements
    - Alignment
    - Vertical Face
    - Adequate Material
  - Layout
    - Overlap of Successive Courses
    - Final Lift Must Correspond with Traffic Lanes

Final Lift Joint Layout Plan



Recap

- Longitudinal Joints are more susceptible to failure
- Communication is paramount
- Gather the Required Information
- Establish a Plan of Attack
- Coordination

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This is how we do it!!!

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This is how we do it!!!

The Year in Review

This is how we do it!!!

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This is how we do it!!!

Public Works Rules

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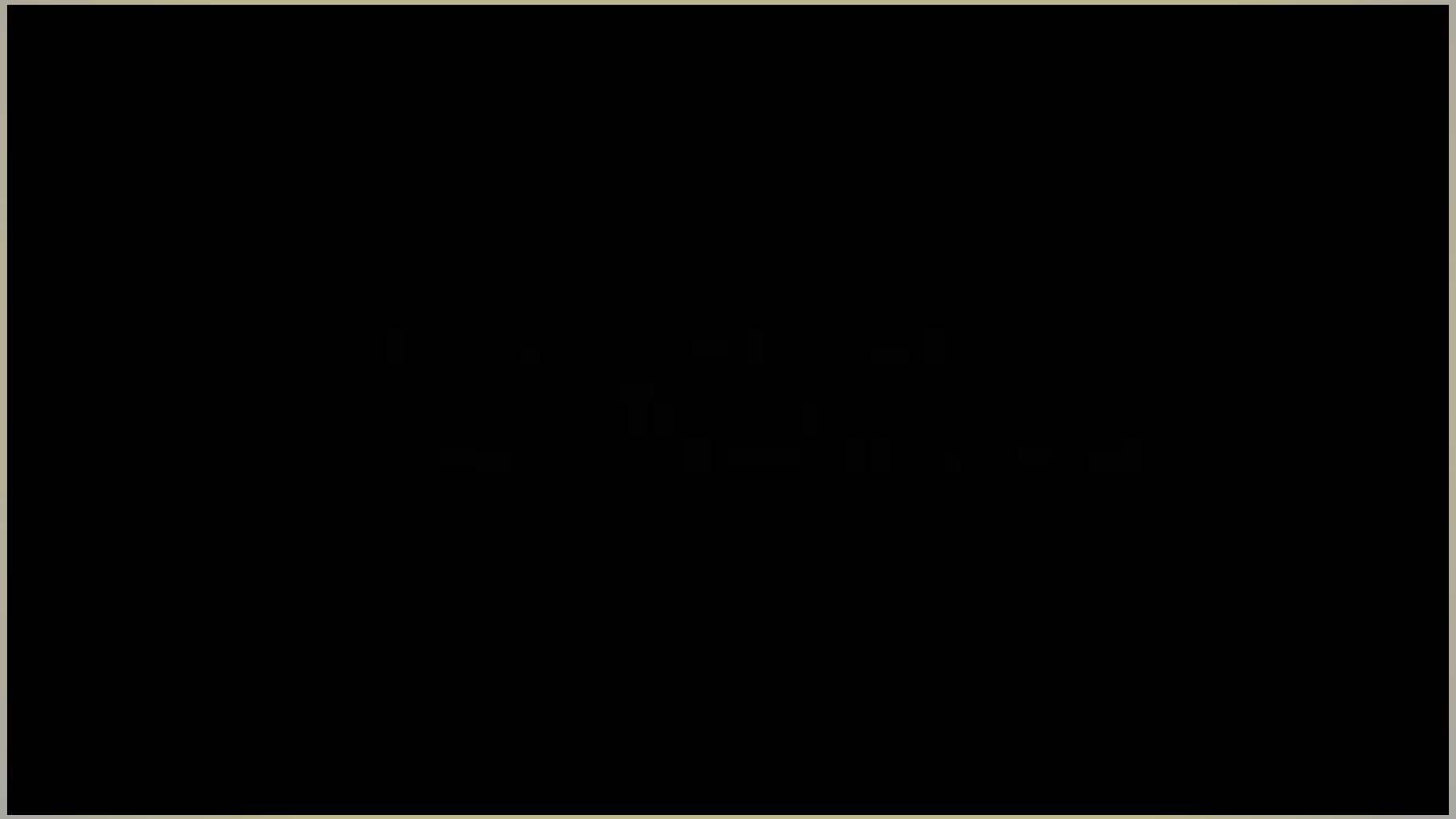
No. 2: Safety Edges

- **Why?**
- **Specifications / Details**
- **Extrusion**

Why a Safety Edge?



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Reducing the Frequency and Severity of Roadway Departure Crashes

A roadway departure crash is a non-intersection crash which occurs after a vehicle crosses an edge line, a center line or otherwise leaves the traveled way. These crashes frequently result in an injury or fatality when the departing vehicle strikes another vehicle or one or multiple fixed objects located outside the travel way such as trees, utility poles, ditches and bridge abutments after the initial roadway departure. In many cases, roadway departure crashes involve a single vehicle; therefore DelDOT's strategies will first address keeping vehicles on the roadway and secondly address the consequences of leaving the roadway.

See the Reducing the Frequency and Severity of Roadway Departure Crashes section of the Delaware Strategic Highway Safety Plan.

Safety Edge

Pavement edge drop-off is the uneven edge or vertical drop-off between the paved edge of roadway and the unpaved shoulder area. A drop-off of 2-inches or more is considered to be a hazard to errant vehicles especially if the edge is at a 90° angle to the shoulder surface. Pavement edge drop-offs result from overlays, pavement-edge breaking, erosion, wear of unpaved shoulders or when the shoulder is not flush with the pavement following a construction project. A combination of shoulder erosion and edge rutting caused by vehicles repeatedly leaving the paved travel lane are typically found at these locations.

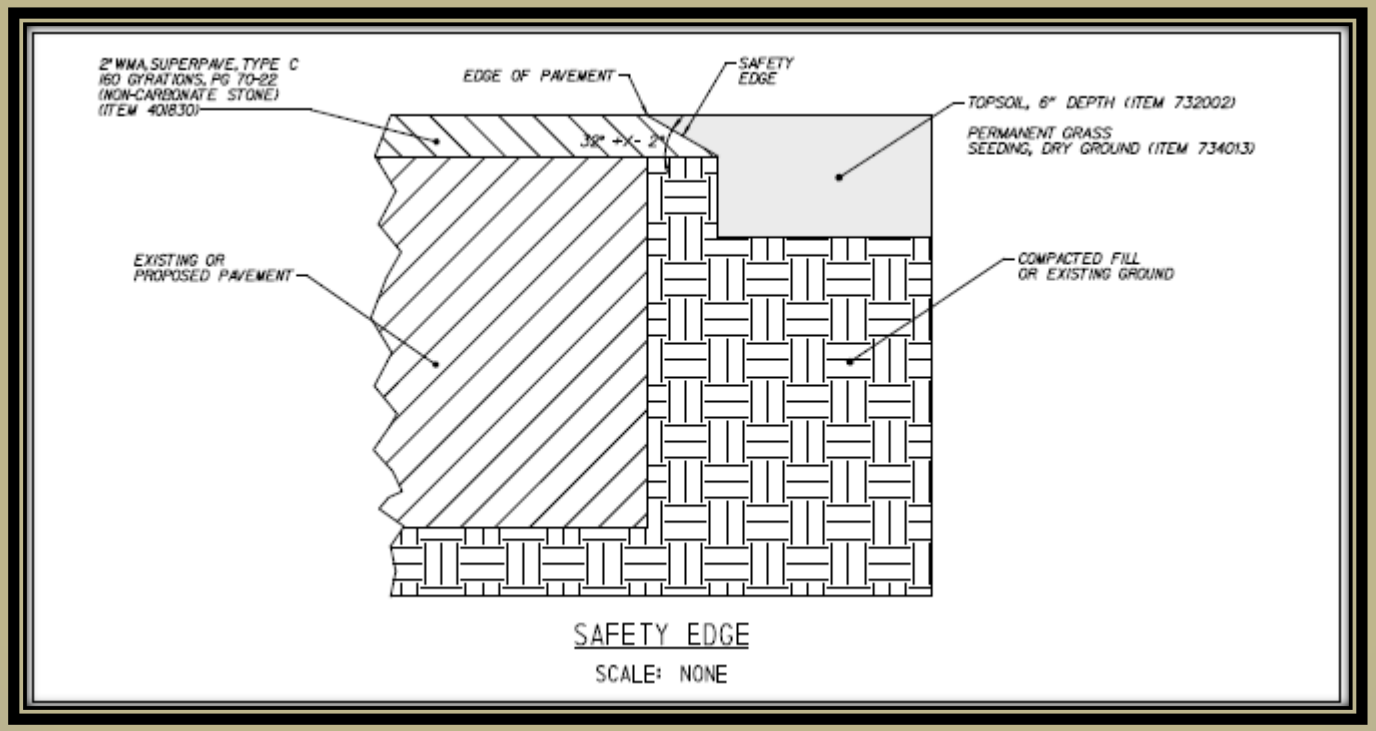
Once a vehicle has slipped off the pavement and onto the unpaved or deteriorated shoulder, abrupt or vertical pavement edge drop-off can make it difficult for a driver to reenter the paved travel lane. Studies show that drivers tend to attempt to return immediately to the paved travel lane; in doing so, they tend to over steer when "scrubbing" (the intense rubbing of the right-side vehicle tires against the pavement edge) prevents the vehicle from climbing back onto the pavement.

Safety edge is a relatively easy and inexpensive countermeasure to pavement edge drop-offs. It is a tapered transition between the paved surface and the unpaved shoulder. The recommended 32° ± 5° angle with the horizontal tapered pavement edge or fillet can help drivers make a smoother, more controlled reentry back onto the paved travel lane compared to a more abrupt or vertical edge. The tapered edge helps prevent drivers form overcorrecting if the drift onto the shoulder, thus decreasing the likelihood of the vehicle crossing into opposing traffic or leaving the roadway.

The Delaware Department of Transportation has completed a test location of the Safety Edge countermeasure. This project was completed on Old Furnace Road in Sussex County, Delaware during a recent pavement rehabilitation project (see photos). Since the demonstration project has been completed, there have been no reported roadway departure crashes. DelDOT has recently finalized the Design Guidance Memorandum and Specifications for the installation of Safety Edge on projects statewide. Safety Edge will be included on all projects starting in 2011.

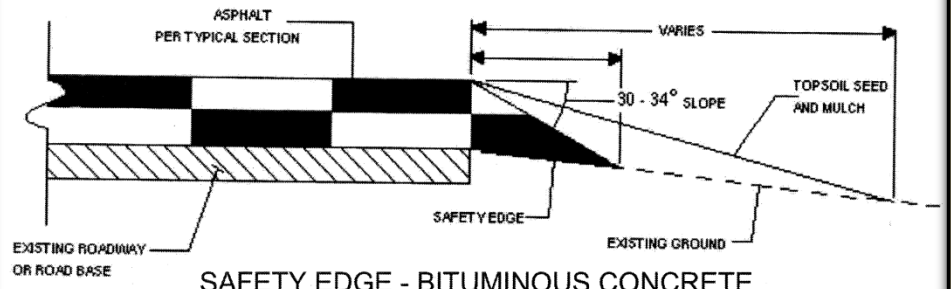
- Safety Edge Design Guidance Memorandum
- FHWA safety edge website

Construction Details

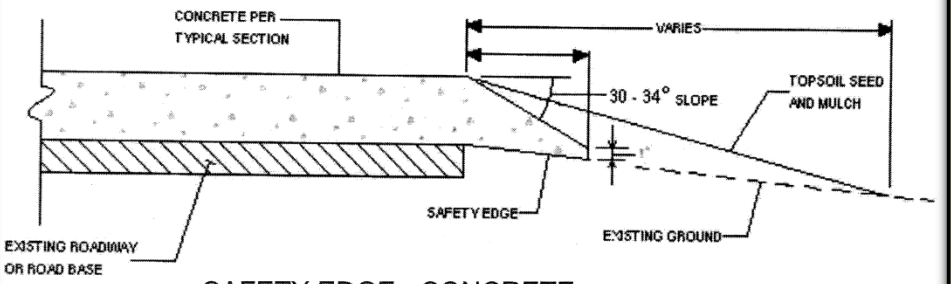


Bid Proposal Details

DETAILS SHEET



SAFETY EDGE - BITUMINOUS CONCRETE



SAFETY EDGE - CONCRETE

GENERAL NOTES

1. THE SAEFTY EDGE WILL BE CONSTRUCTED AS PART OF THE ROADWAY PAVEMENT. A SHOULDER WEDGE DEVICE WILL BE ADDED TO THE SCREED OF THE PAVEING MACHINE.

2. SHORT SECTIONS OF HANDWORK WILL BE ALLOWED WHEN NECESSARY FOR TRANSITION AND TURNOUTS.

3. SITE PREPARATION AND ADDITIONAL EARTHWORK REQUIRED TO CONSTRUCT THE SAFETY EDGE WILL NOT BE PAID FOR SEPARATELY BUT SHALL BE INCLUDED IN THE WORK.

Special Provision

401752 – SAFETY EDGE FOR ROADWAY PAVEMENT

Description:

This work consists of the construction of safety edge(s) along bituminous concrete pavement or P.C.C. pavement in accordance with the details and notes on the Plans and as directed by the Engineer.

Construction Methods:

The safety edge shall not be constructed adjacent to curb or in front of guardrail sections.

In bituminous concrete pavement sections, prior to the construction of the safety edge, the fill or in situ material at the edge of pavement shall be compacted so that it is level with the top of the pavement, prior to the final surface overlay.

In bituminous concrete pavement sections, the contractor shall attach a device to the screed of the paver unit that confines the material at the end of the gate and extrudes the asphalt material in such a way that results in a compacted wedge shape pavement edge of 32 degrees (+/- 2 degrees). Contact shall be maintained between the device and the road shoulder surface. The device shall be manufactured so that it can be easily adjusted to transition at cross roads, driveways and obstructions without stopping the paver unit. The device's shape shall constrain the asphalt and cause compaction, as well as increase the density of the extruded profile.

In bituminous concrete pavement sections, the Transtech Shoulder Wedge Maker, Carlson Safety Edge End Gate or an approved equal shall be used to produce the safety edge. Contact information for these wedge shape compaction devices is listed below:

Transtech Systems, Inc.
1594 State Street
Schenectady, NY 12304
1-800-724-6306
www.transtechsys.com

or

Carlson Paving Products
18425 50th Ave. E
Tacoma, WA 98446
1-253-278-9426
www.carlsonpavingproducts.com

or an approved equal.

In P.C.C. pavement sections, the paver screed shall be modified to provide a chamfer at the end of the P.C.C. pavement in accordance with the details and notes on the Plans, or as directed by the Engineer.

Standard Specification

In bituminous concrete pavement sections, the contractor shall attach a device to the screed of the paver unit that confines the material at the end of the gate and extrudes the asphalt material in such a way that results in a compacted wedge shape pavement edge of 32 degrees (+/- 2 degrees). Contact shall be maintained between the device and the road shoulder surface. The device shall be manufactured so that it can be easily adjusted to transition at cross roads, driveways and obstructions without stopping the paver unit. The device's shape shall constrain the asphalt and cause compaction, as well as increase the density of the extruded profile.

In bituminous concrete pavement sections, the Transtech Shoulder Wedge Maker, Carlson Safety Edge End Gate or an approved equal shall be used to produce the safety edge. Contact information for these wedge shape compaction devices is listed below:

Safety Edge Hardware

- Devices in Orange are on the Market

Georgia DOT

TransTech

Troxler

Advant-Edge

Boggs

NCDOT Prototype

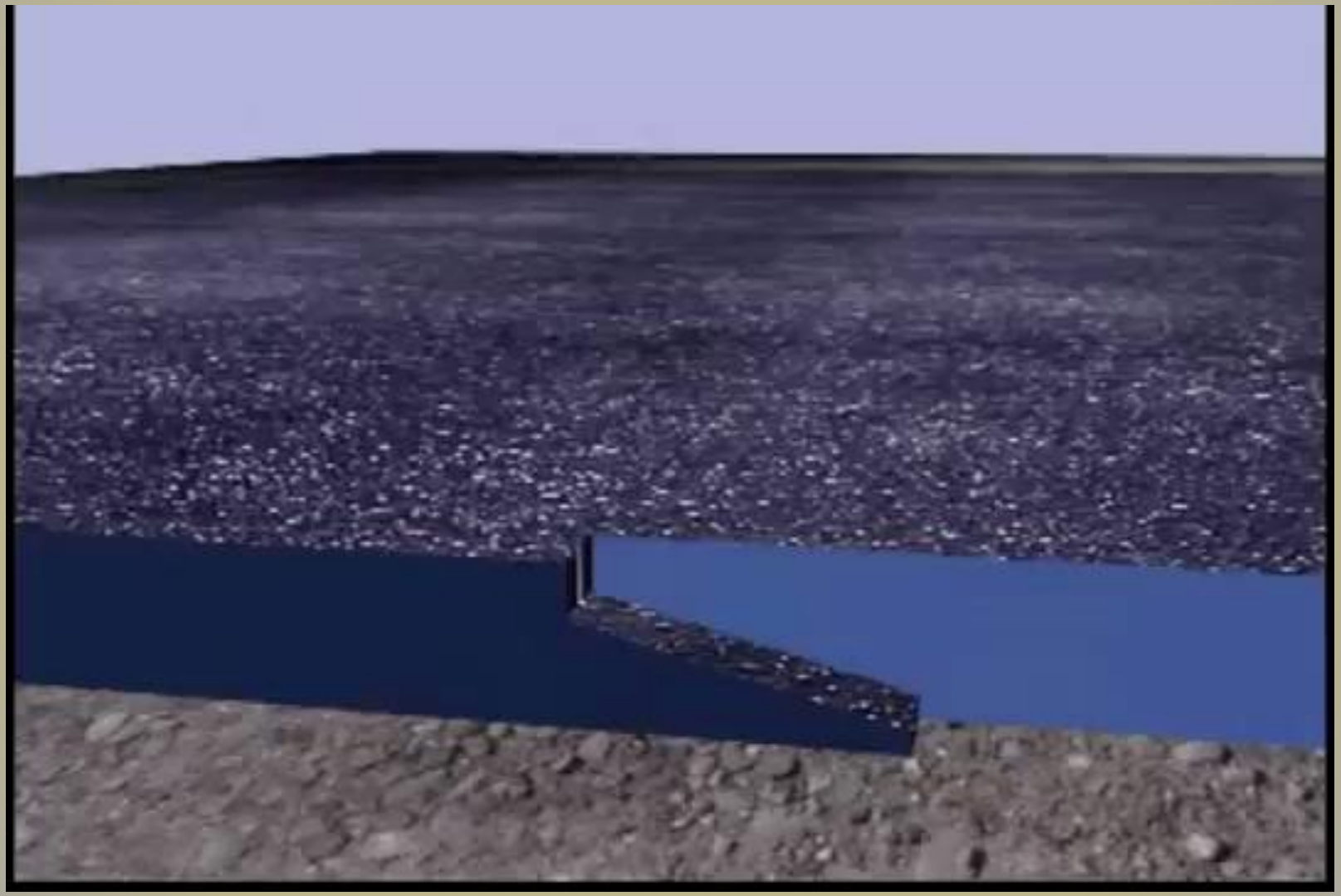
Carlson End Gate

Transition Areas

- Driveway / Cross Road

Using the electric drill to raise and lower the device allows for a smooth driveway / cross road transition.

Transtech Safety Edge Shoe



Carlson Safety Edge Form

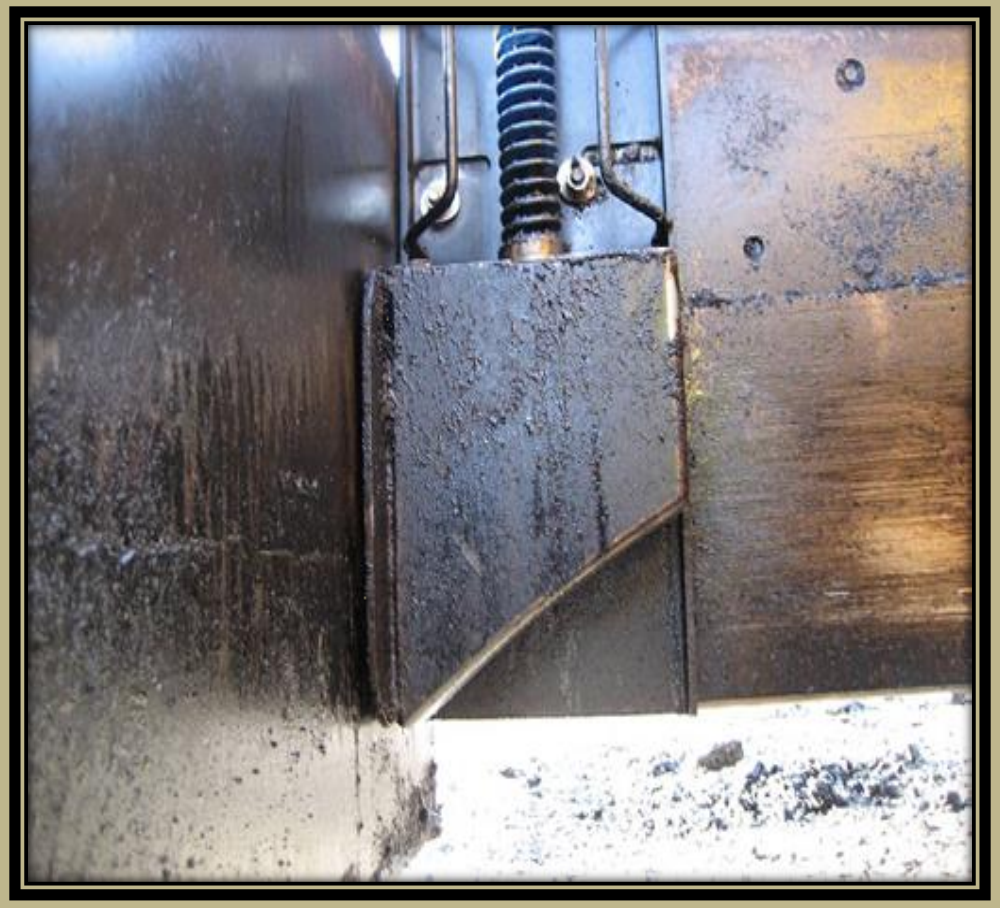
Inspector's Responsibilities

Verify that the Plans have a Detail for the Safety Edge.

Discuss @ Pre-Pave Meeting.

Verify that a Safety Edge Shoe is installed on the paver extension or screed.

Have you seen this?



Also known as Dulcolax

Have you seen this?

Good or Bad?

Good or Bad?

Good or Bad?

Good or Bad?

Good or Bad?

Have you seen this?

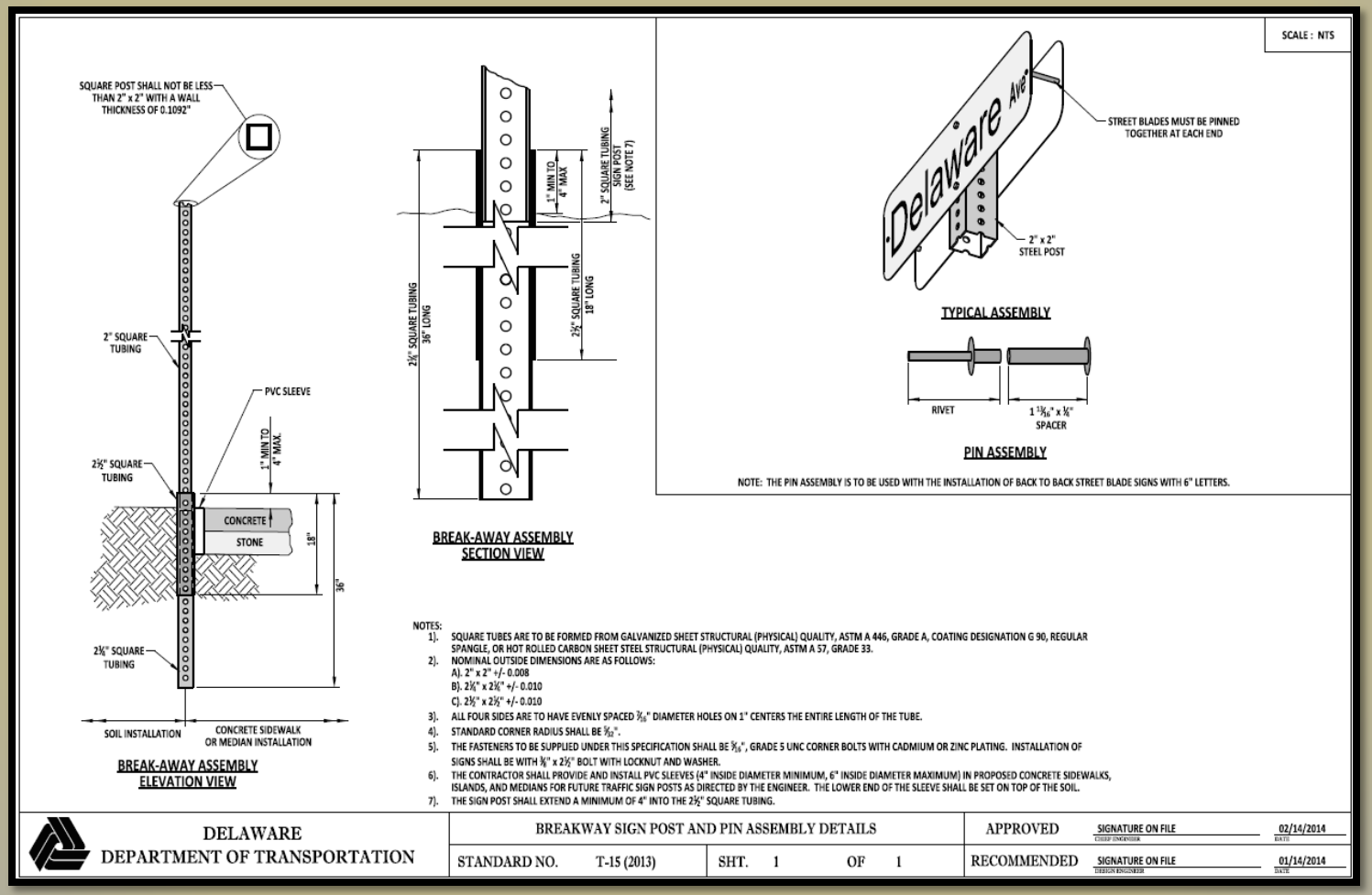
Public Works Again

The Year in Review

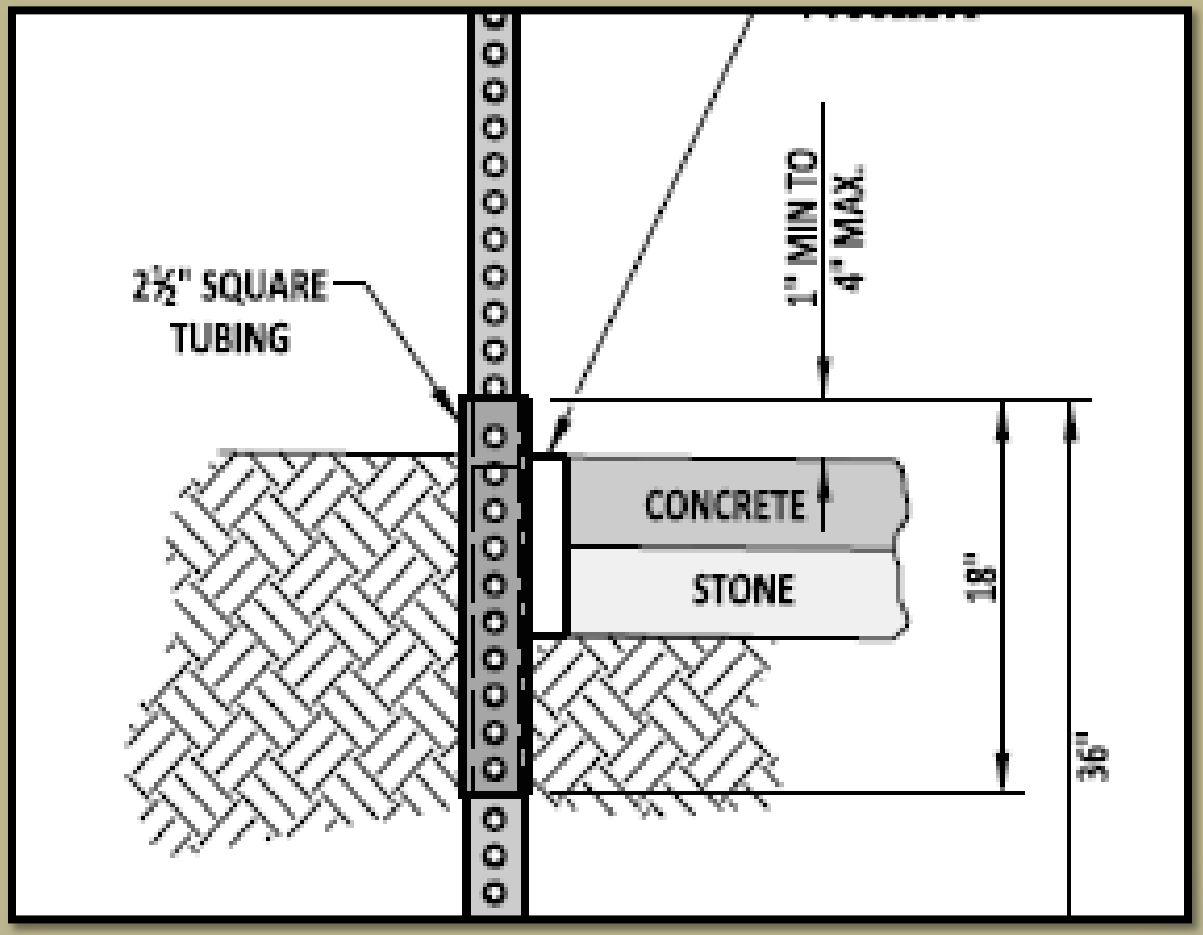
No. 3: Sign Posts

- **Breakaway Assembly**
- **Breakaway Height**
- **Missing Sleeves**

Standard Construction Details



Standard Construction Details



Standard Construction Details

NOTES:

1). SQUARE TUBES ARE TO BE FORMED FROM GALVANIZED SHEET STRUCTURAL (PHYSICAL) QUALITY, ASTM A 446, GRADE A, COATING DESIGNATION G 90, REGULAR SPANGLE, OR HOT ROLLED CARBON SHEET STEEL STRUCTURAL (PHYSICAL) QUALITY, ASTM A 57, GRADE 33.

2). NOMINAL OUTSIDE DIMENSIONS ARE AS FOLLOWS:
   A). 2" x 2" +/- 0.008
   B). 2¼" x 2¼" +/- 0.010
   C). 2½" x 2½" +/- 0.010

3). ALL FOUR SIDES ARE TO HAVE EVENLY SPACED 3/16" DIAMETER HOLES ON 1" CENTERS THE ENTIRE LENGTH OF THE TUBE.

4). STANDARD CORNER RADIUS SHALL BE 5/32".

5). THE FASTENERS TO BE SUPPLIED UNDER THIS SPECIFICATION SHALL BE 5/16", GRADE 5 UNC CORNER BOLTS WITH CADMIUM OR ZINC PLATING. INSTALLATION OF SIGNS SHALL BE WITH ⅜" x 2½" BOLT WITH LOCKNUT AND WASHER.

6). THE CONTRACTOR SHALL PROVIDE AND INSTALL PVC SLEEVES (4" INSIDE DIAMETER MINIMUM, 6" INSIDE DIAMETER MAXIMUM) IN PROPOSED CONCRETE SIDEWALKS, ISLANDS, AND MEDIANS FOR FUTURE TRAFFIC SIGN POSTS AS DIRECTED BY THE ENGINEER. THE LOWER END OF THE SLEEVE SHALL BE SET ON TOP OF THE SOIL.

7). THE SIGN POST SHALL EXTEND A MINIMUM OF 4" INTO THE 2½" SQUARE TUBING.

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Sign Posts

The Year in Review

Sign Posts

The Year in Review

Sign Posts

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Sign Posts

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Sign Posts

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No. 4: Adjustment Patches

- **Definition of a Patch**
- **Specifications**
- **Construction Details**

Definition of a Patch

- a small part of a surface that is different in some way from the area around it:
- a piece of material put over a damaged area or hole to repair, strengthen, or cover it:

Specifications

CONSTRUCTION METHODS.

710.07 Drainage Inlets and Manholes. Drainage inlets and manholes, including the concrete curb portion of the drainage inlet, shall be adjusted to vertical grade. Drainage inlets and manholes shall be repaired as required, prior to the paving operations.

Specifications

CONSTRUCTION METHODS.

503.11 Joints.

All joints so constructed and to be overlaid with hot-mix shall be sealed with hot-poured joint sealant within five working days of concrete placement prior to placement of the overlay hot-mix. All other joints remaining exposed as part of the existing concrete pavement shall be sealed according to the requirements of Subsection 501.18 with low-modulus silicone rubber joint sealant.

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Utility Adjustments

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Utility Adjustments

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Utility Adjustments

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Utility Adjustments

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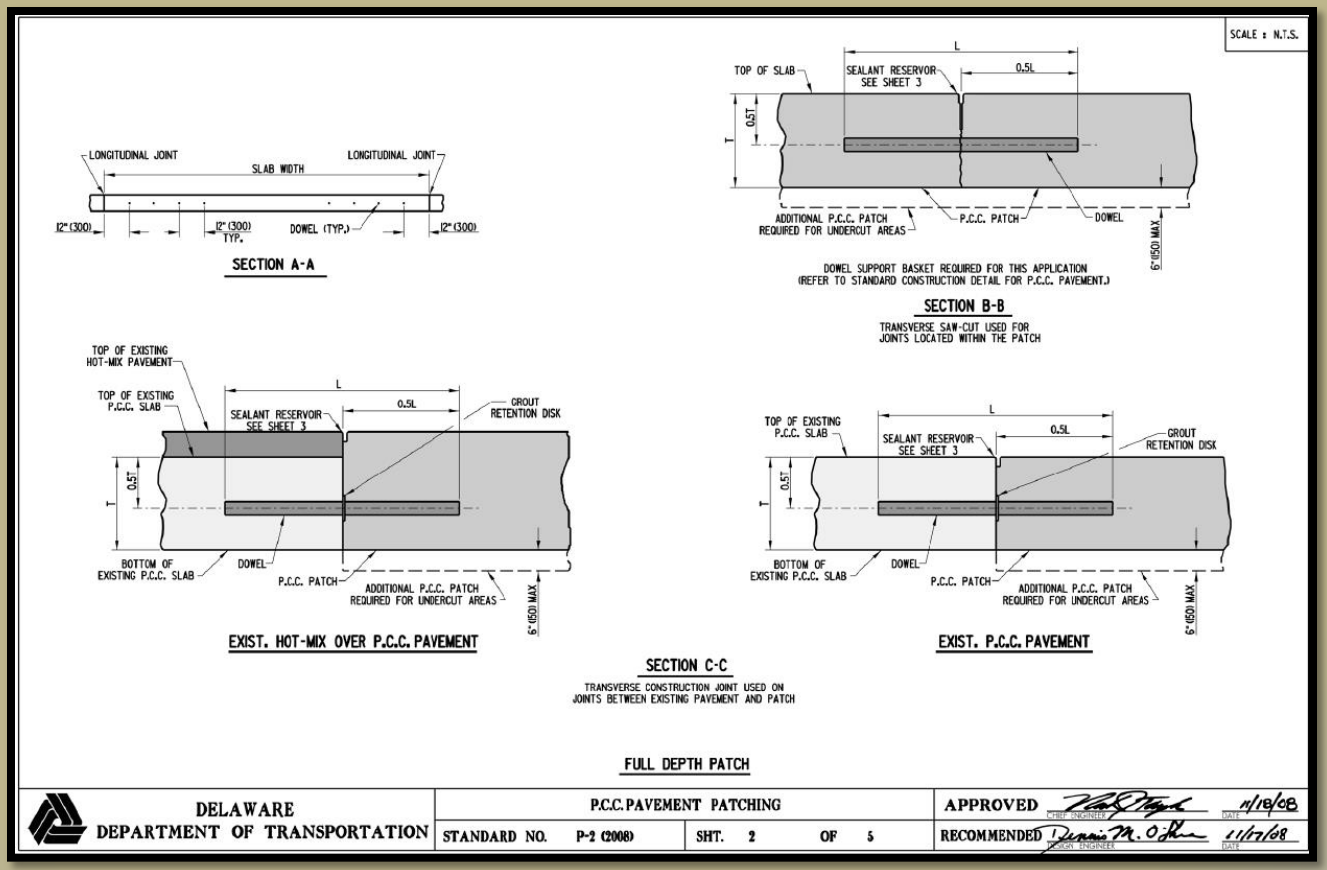
Standard Construction Detail



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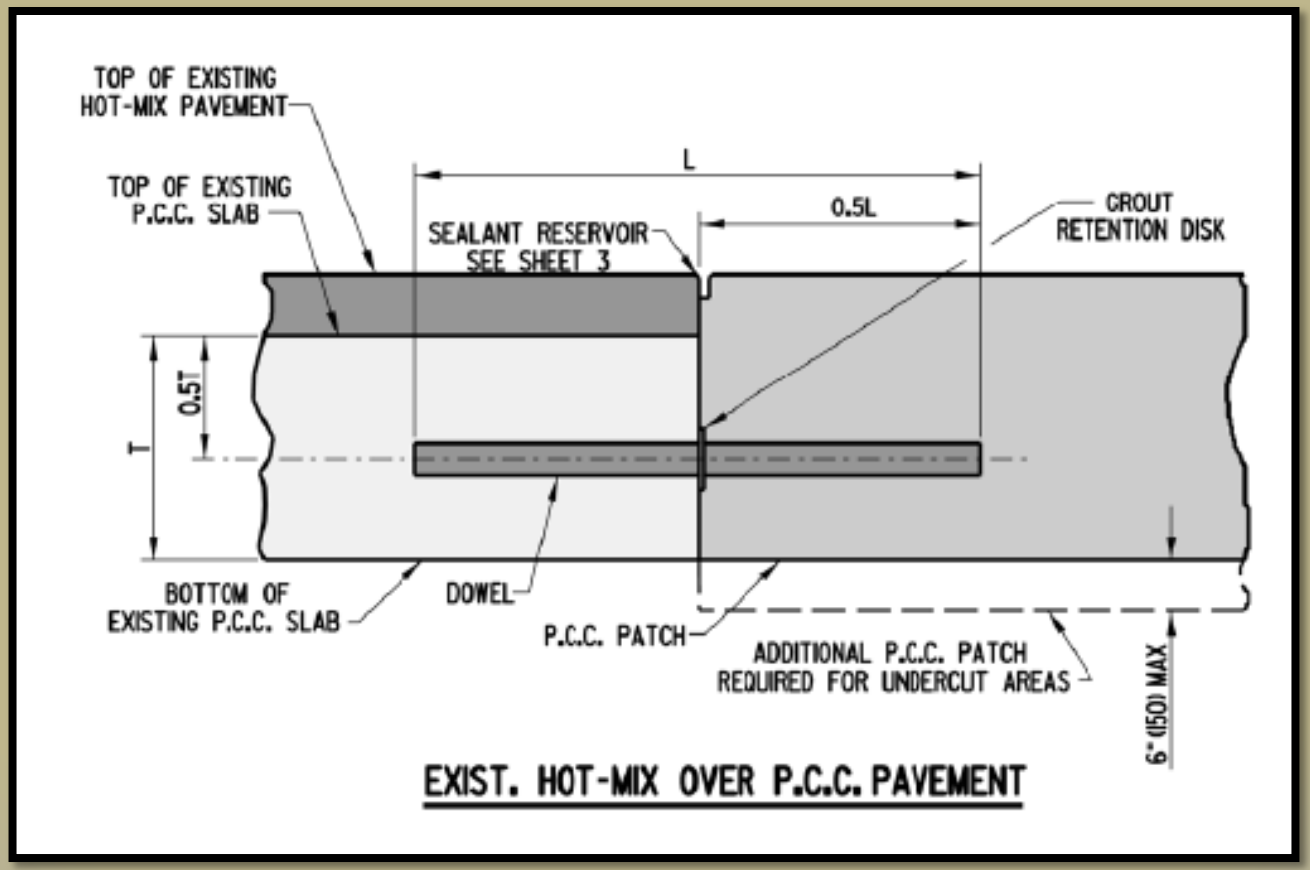

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Patch Perimeter Seal

Group I Construction Rocks

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No. 5: Curb Radii

- **Damage Prone**
- **Details**

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Where is this located?

The Year in Review

What Curb Radius?

The Year in Review

What Curb Radius?

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What Curb Radius?

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What Curb Radii

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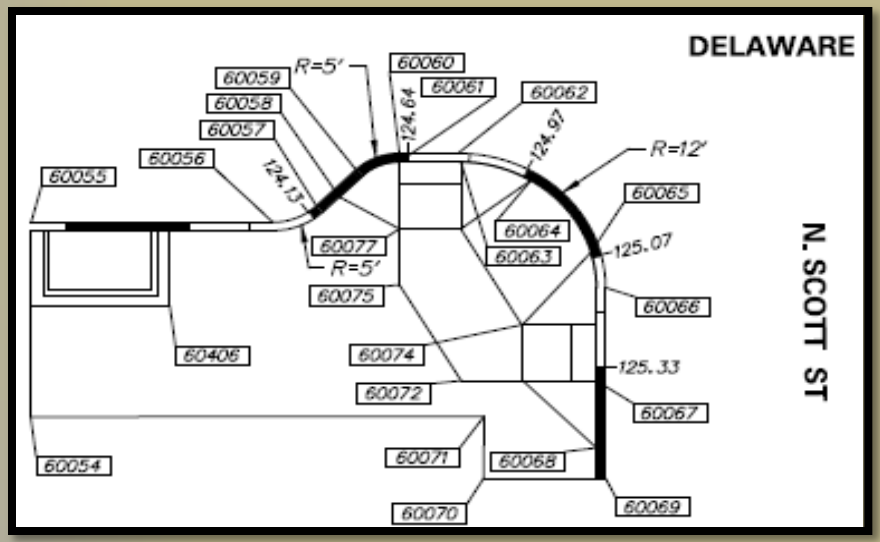
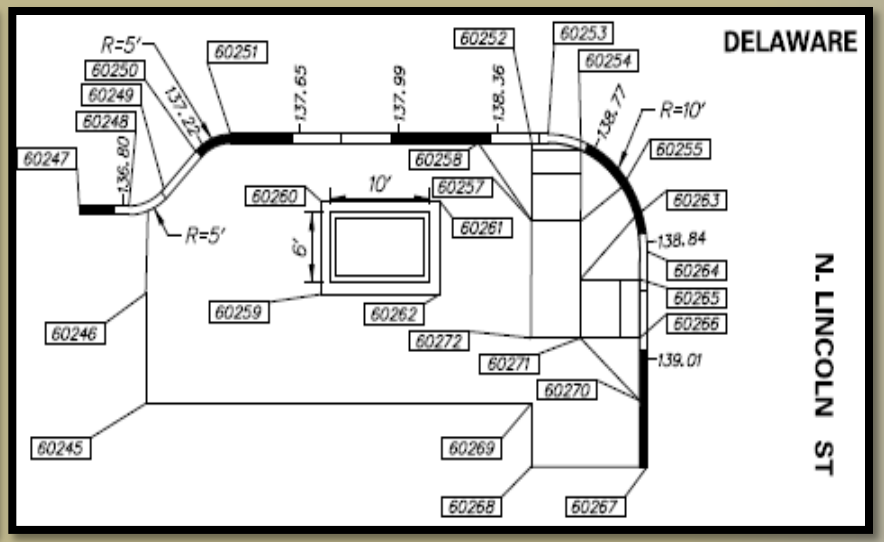
These Curb Radii





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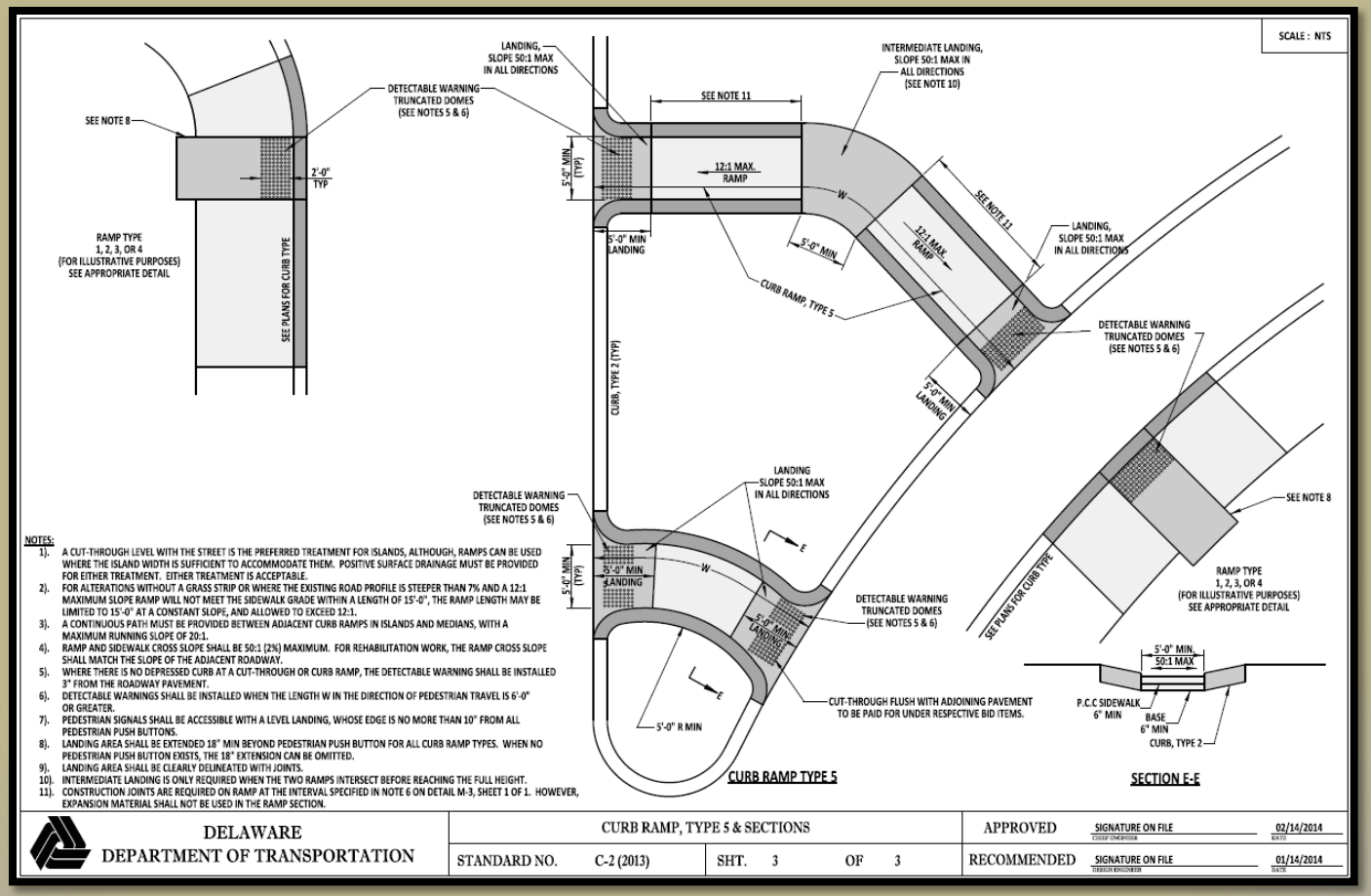
Standard Construction Detail



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